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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Toshiaki Okuno

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EXAMINER

CURS, NATHAN M

ART UNIT

PAPER NUMBER

2613

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

SK

Office Action Summary	Application No.	Applicant(s)	
	10/820,794	OKUNO, TOSHIKI	
	Examiner	Art Unit	
	Nathan Curs	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 9-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 10 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification limits the value "B" in the equation $-80,000/B^2$ to be the numerical value of the Gbps bit rate (i.e. a unitless "10" in the case of a 10 Gbps bit rate). Amended claim 10 claims that B represents "a bit rate", without limiting the value of B to a Gbps rate value.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-4, 6, 7, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luo et al. ("Luo") (*Non-zero dispersion shifted fiber with low dispersion slope*, Luo et al. Communications, 1999. APCC/OECC '99. Fifth Asia-Pacific Conference on... and Fourth Optoelectronics and Communications Conference. Volume 2, 18-22 Oct. 1999. Pages: 1373-

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1374) in view of Blez et al. ("Blez") (*High speed ultralow chirp 1.55 μ m MBE grown GaInAs/AlGaInAs MQW DFB lasers*, Blez et al., Electronics Letters, Volume 28, Issue 11, 21 May 1992, Pages: 1040-1043).

Regarding claim 1, Luo discloses an optical transmission system, comprising: at least one optical fiber that: constitutes the principal portion of an optical transmission line at at least one repeater section (page 1373, cols. 1 and 2, Introduction section); transmits a signal lightwave carrying at least one signal outputted by a light source (page 1373, cols. 1 and 2, Introduction section, where a DWDM system inherently has light sources for generating the wavelengths); has a chromatic dispersion that is negative at at least one wavelength of the signal lightwave and has a dispersion slope of at most 0.05 ps/nm.sup.2/km in absolute value at the at least one wavelength (page 1374, fig. 2 and col. 2, Conclusions section). Luo discloses a WDM system operating in the 1.55 μ m window at 10 Gbps, but does not disclose directly modulated light sources. Blez discloses lasers for 1.55 μ m window transmission at 10 Gbps, where the alpha parameter is at least 1.0 (page 1040, col. 2 to page 1041, col. 1, *Introduction* section and page 1041, col. 2 to page 1042 col. 1, *Linewidth enhancement factor determination* and *Conclusion* sections). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the directly modulated lasers of Blez for the WDM system of Luo, to provide the benefit of good static, dynamic and spectral performance, as taught by Blez.

Regarding claim 2, the combination of Luo and Blez discloses an optical transmission system as defined by claim 1, wherein the signal lightwave carries at least three signals having a wavelength different from one another and has a wavelength band of not less than 40 nm (Luo: page 1373, cols. 1 and 2, Introduction section).

Regarding claim 3, the combination of Luo and Blez discloses an optical transmission system as defined by claim 1, wherein: (a) the at least one wavelength is one wavelength, the

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wavelength being about 1550 nm; and (b) the at least one optical fiber has a zero-dispersion wavelength of at least 1610 nm (Luo: Table 1, fig. 2, and page 1373, cols. 1 and 2, Introduction section).

Regarding claim 4, the combination of Luo and Blez discloses an optical transmission system as defined by claim 1, wherein the at least one optical fiber has an effective area of at most $60 \mu\text{m}^2$ at the at least one wavelength (Luo: Table 1).

Regarding claim 6, the combination of Luo and Blez discloses an optical transmission system as defined by claim 1, wherein the at least one optical fiber has a chromatic dispersion of at least -16 ps/nm/km at the at least one wavelength (Luo: fig. 2).

Regarding claim 7, the combination of Luo and Blez discloses an optical transmission system as defined by claim 1, wherein the at least one optical fiber has a chromatic dispersion of at least -16 ps/nm/km and at most 0 ps/nm/km at all the wavelengths of the signal lightwave (Luo: fig. 2).

Regarding claim 10, the combination of Luo and Blez discloses an optical transmission system as defined by claim 1, wherein the total accumulated dispersion from the signal-transmitting end to the signal-receiving end is at least $-80000/B^2 \text{ ps/nm}$ and at most 0 ps/nm at the or each wavelength where B represents a bit rate of the at least one signal corresponding to the at least one wavelength (Luo: fig. 2 and page 1374, *Conclusion* section, where the total dispersion of the fiber for 10 Gbps will be between -8000 and 0 ps/nm , since the dispersion is not less -7 ps/nm-km and not greater than 0 ps/nm-km from 1530 to 1620 nm).

Regarding claim 12, the combination of Luo and Blez discloses an optical transmission system as defined by claim 1, wherein the at least one optical fiber has a dispersion slope of at most $0.03 \text{ ps/nm}^2/\text{km}$ in absolute value at the at least one wavelength (Luo: fig. 2 and page 1374, *Conclusion* section).

5. Claims 1 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Islam et al. ("Islam") (US Patent No. 6744553) in view of Blez et al. ("Blez") (*High speed ultralow chirp 1.55 μm MBE grown GaInAs/AlGaInAs MQW DFB lasers*, Blez et al., Electronics Letters, Volume 28, Issue 11, 21 May 1992, Pages: 1040-1043).

Regarding claim 1, Islam discloses an optical transmission system, comprising: at least one optical fiber that: constitutes the principal portion of an optical transmission line at at least one repeater section (figs. 1a and 1b and col. 3, line 32 to col. 4, line 62 and col. 6, lines 13-22); transmits a signal lightwave carrying at least one signal outputted by a light source (fig. 1a, elements 14n); has a chromatic dispersion that is negative at at least one wavelength of the signal lightwave and has a dispersion slope of at most 0.05 ps/nm.sup.2/km in absolute value at the at least one wavelength (col. 8, lines 18-34). Islam discloses a C-band WDM system with light sources, but does not disclose directly modulated light sources. Blez discloses lasers for 1.55 μm window (i.e. C-band) transmission, where the alpha parameter is at least 1.0 (page 1040, col. 2 to page 1041, col. 1, *Introduction* section and page 1041, col. 2 to page 1042 col. 1, *Linewidth enhancement factor determination* and *Conclusion* sections). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the directly modulated lasers of Blez for the WDM system of Islam, to provide the benefit of good static, dynamic and spectral performance, as taught by Blez.

Regarding claim 9, the combination of Islam and Blez discloses an optical transmission system as defined by claim 1, wherein the at least one optical fiber has non-linearity constant γ at the at least one wavelength and a power P_{in} of the signal lightwave to be inputted into the at least one optical fiber having the formula, $\gamma P_{in} > 1.51 \times 10^{-6}/\text{m}$ (col. 8, lines 18-34).

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6. Claims 1 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berkey et al. ("Berkey") (US Patent Application Publication No. 2002/0094179) in view of Blez et al. ("Blez") (*High speed ultralow chirp 1.55 μ m MBE grown GaInAs/AlGaInAs MQW DFB lasers*, Blez et al., Electronics Letters, Volume 28, Issue 11, 21 May 1992, Pages: 1040-1043).

Regarding claim 1, Berkey discloses an optical transmission system, comprising: at least one optical fiber that: constitutes the principal portion of an optical transmission line at at least one repeater section and transmits a signal lightwave carrying at least one signal outputted by a light source (paragraphs 0003 and 0010, where the fiber is disclosed in the context of WDM transmission with amplifiers); has a chromatic dispersion that is negative at at least one wavelength of the signal lightwave and has a dispersion slope of at most 0.05 ps/nm²/km in absolute value at the at least one wavelength (paragraph 0026). Berkey discloses WDM transmission in the 1550 nm window, but does not disclose directly modulated light sources. Blez discloses lasers for 1.55 μ m window transmission, where the alpha parameter is at least 1.0 (page 1040, col. 2 to page 1041, col. 1, *Introduction* section and page 1041, col. 2 to page 1042 col. 1, *Linewidth enhancement factor determination* and *Conclusion* sections). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the directly modulated lasers of Blez for the WDM fiber system of Berkey, to provide the benefit of good static, dynamic and spectral performance, as taught by Blez.

Regarding claim 13, the combination of Berkey and Blez discloses an optical transmission system as defined by claim 1, wherein the at least one optical fiber has a dispersion slope of at most 0.01 ps/nm²/km in absolute value at the at least one wavelength (Berkey: paragraph 0026).

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7. Claims 1 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tirloni et al. ("Tirloni") (US Patent Application Publication No. 2004/0028359) in view of Blez et al. ("Blez") (*High speed ultralow chirp 1.55 μm MBE grown GaInAs/AlGaInAs MQW DFB lasers*, Blez et al., Electronics Letters, Volume 28, Issue 11, 21 May 1992, Pages: 1040-1043).

Regarding claim 1, Tirloni discloses an optical transmission system, comprising: at least one optical fiber that: constitutes the principal portion of an optical transmission line at at least one repeater section and transmits a signal lightwave carrying at least one signal outputted by a light source (fig. 1 and paragraphs 0001, 0002, 0032 and 0064); has a chromatic dispersion that is negative at at least one wavelength of the signal lightwave and has a dispersion slope of at most $0.05 \text{ ps/nm}^2/\text{km}$ in absolute value at the at least one wavelength (paragraphs 0119-0125). Antos discloses a 1550 nm window WDM transmission system, but does not disclose directly modulated light sources. Blez discloses lasers for 1.55 μm window transmission, where the alpha parameter is at least 1.0 (page 1040, col. 2 to page 1041, col. 1, *Introduction* section and page 1041, col. 2 to page 1042 col. 1, *Linewidth enhancement factor determination* and *Conclusion* sections). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the directly modulated lasers of Blez for the WDM system of Tirloni, to provide the benefit of good static, dynamic and spectral performance, as taught by Blez.

Regarding claim 14, the combination of Tirloni and Blez discloses an optical transmission system as defined by claim 1, wherein the at least one optical fiber has an effective area of at most $50 \mu\text{m}^2$ at the at least one wavelength (Tirloni: paragraph 0125).

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Luo (*Non-zero dispersion shifted fiber with low dispersion slope*. Luo et al. Communications, 1999. APCC/OECC '99. Fifth Asia-Pacific Conference on... and Fourth Optoelectronics and

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Communications Conference. Volume 2, 18-22 Oct. 1999. Pages: 1373-1374) in view of Blez (*High speed ultralow chirp 1.55 μm MBE grown GaInAs/AlGaInAs MQW DFB lasers*, Blez et al., Electronics Letters, Volume 28, Issue 11, 21 May 1992, Pages: 1040-1043) as applied to claims 1-4, 6, 7, 10 and 12 above, and further in view of Bickham et al. ("Bickham") (US Patent Application Publication No. 2004/0126074).

Regarding claim 5, the combination of Luo and Culverhouse discloses an optical transmission system as defined by claim 1, wherein the at least one optical fiber has a cutoff wavelength of at most 1600 nm (Luo: Table 1). Luo does not disclose that the cutoff wavelength value shown in the table was measured on a 2-m length portion of the fiber. However, Bickham discloses determining a cutoff wavelength spec for NZDSF fiber using the standard 2-m length measurement method (paragraphs 0003, 0047 and 0048). It would have been obvious to one of ordinary skill in the art at the time of the invention to derive the cutoff wavelength spec provided by Luo from the standard 2-m measurement test since specifying a cutoff wavelength for fiber based on the 2-m measurement test provides a normalized, realistic spectral response for the fiber close that is close to the theoretical cutoff for the fiber.

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Luo (*Non-zero dispersion shifted fiber with low dispersion slope*, Luo et al. Communications, 1999. APCC/OECC '99. Fifth Asia-Pacific Conference on... and Fourth Optoelectronics and Communications Conference. Volume 2, 18-22 Oct. 1999. Pages: 1373-1374) in view of Blez (*High speed ultralow chirp 1.55 μm MBE grown GaInAs/AlGaInAs MQW DFB lasers*, Blez et al., Electronics Letters, Volume 28, Issue 11, 21 May 1992, Pages: 1040-1043) as applied to claims 1-4, 6, 7, 10 and 12 above, and further in view of Culverhouse et al. ("Culverhouse") (Culverhouse et al. *Corning® MetroCor™ Fiber and its Application in Metropolitan Networks*

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[online]. July 2000 [retrieved 2007-01-02]. Retrieved from the Internet <URL:

http://www.corning.com/docs/opticalfiber/wp5078_7-00.pdf).

Regarding claim 11, the combination of Luo and Blez discloses an optical transmission system as defined by claim 1. Luo does not disclose that the at least one repeater section has a length of at least 75 km. However, Culverhouse discloses repeater section lengths of at least 75km for a multiple-section WDM system using NZDSF fiber (fig. 4 and page 3, col. 2 to page 4, col. 1, Experimental Results section). It would have been obvious to one of ordinary skill in the art at the time of the invention to using at least one repeater section of at least 75 km as an engineering design choice in implementing the NZDSF fiber WDM system already disclosed by Luo. The section length of the one section claimed merely amounts to the selection of expedients known as design choices to one of ordinary skill in the art.

Response to Arguments

10. Applicant's arguments of 25 April 2007 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period


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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://paired.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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